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☐	L6	L4 and rice	5
☐	L5	L4 and (rice or arabidopsis)	5
☐	L4	L3 and l2	5
☐	L3	proline dehydrogenase or prodh	40
☐	L2	L1 and transgenic	57
☐	L1	p5cs	127

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NEWS 15	AUG 04	Pricing for the Save Answers for SciFinder Wizard within STN Express with Discover! will change September 1, 2004
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NEWS 17	AUG 27	BIOTECHABS/BIOTECHDS: Two new display fields added for legal status data from INPADOC
NEWS 18	SEP 01	INPADOC: New family current-awareness alert (SDI) available
NEWS 19	SEP 01	New pricing for the Save Answers for SciFinder Wizard within STN Express with Discover!
NEWS 20	SEP 01	New display format, HITSTR, available in WPIDS/WPINDEX/WPIX

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=> s p5cs and (rice or arabidopsis)
L1 83 P5CS AND (RICE OR ARABIDOPSIS)

=> dup rem l1
PROCESSING COMPLETED FOR L1
L2 47 DUP REM L1 (36 DUPLICATES REMOVED)

=> d 1-10 ti

L2 ANSWER 1 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Sequence homologs of stress response-associated transcription factors from plants and their use in modulating intermediary metabolism to improve biomass yields and stress resistance

L2 ANSWER 2 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Phospholipase D Is a Negative Regulator of Proline Biosynthesis in **Arabidopsis** thaliana

L2 ANSWER 3 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
TI Comparative genomics in salt tolerance between **Arabidopsis** and **Arabidopsis**-related halophyte salt cress using **Arabidopsis** microarray

L2 ANSWER 4 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2
TI Stress-inducible synthesis of proline in transgenic **rice** confers faster growth under stress conditions than that with constitutive synthesis

L2 ANSWER 5 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Stress-inducible OsP5CS2 gene is essential for salt and cold tolerance in **rice**

L2 ANSWER 6 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Proline accumulation and AtP5CS2 gene activation are induced by plant-pathogen incompatible interactions in **Arabidopsis**

L2 ANSWER 7 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 3
TI Proline accumulation and Δ1-pyrroline-5-carboxylate synthetase gene properties in three **rice** cultivars differing in salinity and drought tolerance

L2 ANSWER 8 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Monitoring expression profiles of **Arabidopsis** gene expression

during rehydration process after dehydration using ca. 7000 full-length cDNA microarray

L2 ANSWER 9 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Production of cDNA from mRNA of **P5CS** coding gene in **Arabidopsis** thaliana

L2 ANSWER 10 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 4
TI Light-dependent induction of proline biosynthesis by abscisic acid and salt stress is inhibited by brassinosteroid in **Arabidopsis**.

=> d 4 ab

L2 ANSWER 4 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2
AB Proline accumulation has been shown to correlate with tolerance to drought and salt stresses in plants. Our goal was to compare the growth rate of transgenic **rice** plants in which the expression of a moth bean Δ1-pyrroline-5-carboxylate synthetase (**p5cs**) cDNA was driven sep. with a constitutive and a stress-inducible promoter. We found that both constitutive expression and stress-inducible expression of the **p5cs** cDNA in transgenic **rice** have led to the accumulation of **p5cs** mRNA and proline. Third-generation (R2) transgenic **rice** seedlings showed significantly higher tolerance to stress produced by high levels of NaCl or water deficiency as judged by faster growth of shoots and roots in comparison with non-transformed plants. However, stress-inducible expression of the **P5CS** transgene showed significant advantages over the constitutive expression in increasing the biomass production of transgenic **rice** grown in soil under stress conditions.

=> d 4 so

L2 ANSWER 4 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2
SO Plant Science (Amsterdam, Netherlands) (2004), 166(4), 941-948 CODEN: PLSCE4; ISSN: 0168-9452

=> d 5 ab

L2 ANSWER 5 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
AB We isolated a **rice** T-DNA tagging line, in which T-DNA was inserted into the sixth intron of OsP5CS2. This gene encodes for a protein that is highly homologous to Δ1-pyrroline-5-carboxylate synthetase (**P5CS**), a proline biosynthesis enzyme. The T-DNA contained the promoterless gus gene, allowing generation of a gene fusion between OsP5CS2 and gus. Therefore, the expression pattern of OsP5CS2 could be easily monitored by in situ GUS assay. At the seedling stage, the transcript level was low. However, gene expression was preferentially induced in the dividing zone of the roots by salt, cold, or ABA treatments. In mature spikelets, the gene was expressed mainly in stamens. RT-PCR analyses confirmed the results from the GUS assay. OsP5CS2 transcript was present in reproductive organs, especially the stamens. In seedling roots, transcript levels were increased by treatment with 250 mM NaCl, 4 °C cold stress, or 0.5 μM ABA. Our OsP5CS2 knockout plants were more sensitive to salt and cold stresses than were the wild-type controls. Root and shoot growth in the knockout seedlings were severely retarded when plants were exposed to 250 mM NaCl. Cold treatment for more than 12 h also caused growth retardation in those seedlings. Therefore, our results indicate that the OsP5CS2 gene is necessary for

plant tolerance to salt and cold stresses.

=> d 9 so

L2 ANSWER 9 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
SO Majallah-i Ulum-i Kishavarzi-i Iran (2003), 34(3), 607-615
CODEN: IRJADJ; ISSN: 1017-5652

=> d 9 ab

L2 ANSWER 9 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
AB Plants encountered with drought and salinity produce osmolytes such as proline to help them overcome the stress. Proline is synthesized in a two-step pathway, in which Δ1-proline-5-carboxylate synthase (PSCS) is the key enzyme. To produce cDNA from mRNA, total RNA was extracted from leaves of **Arabidopsis** thaliana exposed to saline conditions. CDNA first strand was made through application of oligo (dT) primer and amplification of **P5CS** mRNA was carried out by two specifics, primer and polymerase chain reaction. Application of labeled probe, confirmed the amplification.

=> d 11-20 ti

L2 ANSWER 11 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Drought-regulated expression of prolyl-tRNA synthetase genes in radish (Raphanus sativus) seedlings

L2 ANSWER 12 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 5
TI Transgenic indica **rice** cvIR-50 over-expressing Vigna aconitifolia Δ1-pyrroline-5-carboxylate synthetase cDNA shows tolerance to high salt

L2 ANSWER 13 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Stress-regulated expression constructs and transgenic plants having altered environmental stress tolerance

L2 ANSWER 14 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Construction of stress tolerant transgenic grass plants with altered proline biosynthesis expressing a Δ1-pyrroline-5-carboxylate synthetase gene or an antisense proline dehydrogenase gene

L2 ANSWER 15 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Regulation of osmotic stress-responsive gene expression by the LOS6/ABA1 locus in **Arabidopsis**

L2 ANSWER 16 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effects of hydrogen peroxide and nitric oxide on both salt and heat stress tolerance in **rice**

L2 ANSWER 17 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Fluorescence in situ hybridization of Δ'-pyrroline-5-carboxylate synthetase (**P5CS**) gene on **rice** chromosome

L2 ANSWER 18 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Nucleic acid compositions, kits, and methods for identification, assessment, prevention, and therapy of human breast cancer

L2 ANSWER 19 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Promtor of **Arabidopsis** thaliana Δ1-pyrroline-5-carboxylate synthetase gene regulates target gene expression under water stress

L2 ANSWER 20 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 6
TI The **Arabidopsis** LOS5/ABA3 locus encodes a molybdenum cofactor sulfurase and modulates cold stress- and osmotic stress-responsive gene expression.

=> d 12 so

L2 ANSWER 12 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 5
SO Journal of Plant Biochemistry and Biotechnology (2003), 12(2), 109-116
CODEN: JPBBEE; ISSN: 0971-7811

=> d 14 pi

L2 ANSWER 14 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	GB 2376236	A1	20021211	GB 2001-30946	20011224
	GB 2376236	B2	20030827		
	JP 2002369634	A2	20021224	JP 2001-174553	20010608
	US 2003014774	A1	20030116	US 2001-26767	20011227
	CN 1390939	A	20030115	CN 2001-144073	20011228

=> d 124 ab
47 ANSWERS ARE AVAILABLE. SPECIFIED ANSWER NUMBER EXCEEDS ANSWER SET SIZE
The answer numbers requested are not in the answer set.
ENTER ANSWER NUMBER OR RANGE (1):14

L2 ANSWER 14 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
AB Transgenic plants overexpressing a Δ1-pyrroline-5-carboxylate synthetase (**P5CS**) gene from either **rice** or from **Arabidopsis** thaliana are claimed. Also claimed are transgenic plant expressing an antisense proline dehydrogenase (ProDH or PDH) gene from **Arabidopsis** thaliana. Plants containing both a sense **P5CS** gene and an antisense ProDH gene are claimed. All these plants have modified proline biosynthesis. These plants may be grass plants, more preferably crop plants such as cereal such as **rice**, corn, millet, barley, rye, turf millet or barn grass. Also claimed are vectors and methods of generating such transgenic plants. These plants have improved stress tolerance, especially for water or salt stress and low temps.

=> d 14 au

L2 ANSWER 14 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
IN Yoshiba, Yoshu; Shinozaki, Kazuko; Shinozaki, Kazuo

=> d 21-30 ti

L2 ANSWER 21 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 7
TI Functional analysis of salt-inducible proline transporter of barley roots.

L2 ANSWER 22 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Transgenic approaches for generating **rice** tolerant of

dehydration stress

L2 ANSWER 23 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 8
TI Overexpression of the **Arabidopsis** CBF3 tanscriptional activator mimics multiple biochemical changes associated with cold acclimation.

L2 ANSWER 24 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 9
TI Oscillation and regulation of proline content by **P5CS** and ProDH gene expressions in the light/dark cycles in **Arabidopsis** thaliana L.

L2 ANSWER 25 OF 47 BIOSIS COPYRIGHT (c) 2004 The Thomson Corporation. on STN
TI Hypersensitivity of an **Arabidopsis** sugar signaling mutant toward exogenous proline application.

L2 ANSWER 26 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Hypersensitivity of an **Arabidopsis** sugar signaling mutant toward exogenous proline application. [Erratum to document cited in CA133:147618]

L2 ANSWER 27 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 10
TI Molecular cloning and characterization of a cDNA encoding proline transporter in **rice**

L2 ANSWER 28 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 11
TI Hypersensitivity of an **Arabidopsis** sugar signaling mutant toward exogenous proline application. [Erratum: June 2000, v. 123 (2), p. 777-790.]

L2 ANSWER 29 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Structural analysis of Δ1-pyrroline-5-carboxylate synthetase gene from Bruguiera gymnorrhiza

L2 ANSWER 30 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Water stress or salt stress tolerant transgenic cereal plants

=> d 22 ab

L2 ANSWER 22 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
AB A review. Transgenic approaches offer new opportunities to improve tolerance for dehydration stress in **rice** by incorporating genes that are involved in stress tolerance. In this chapter, we present the results of transforming **rice** sep. with plasmids containing genes that encode a group 3 LEA (late embryogenesis abundant) protein, a group 2 LEA protein, a group 1 LEA protein, and a delta 1-pyrroline-5-carboxylate synthetase (**P5CS**). In each experiment, the growth of transgenic plants under dehydration stress was shown to be faster than that of nontransformed control plants. To maximize gene expression and plant growth, we compared the results of using a constitutive promoter and a stress-inducible promoter in driving the expression of the **P5CS** gene. Next, the effect of using a matrix attachment region sequence on transgene expression was tested. Finally, we compared two commonly used methods for transforming **rice**.

=> d 22 so

L2 ANSWER 22 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
SO Rice Genetics IV, [Proceedings of the International Rice Genetics Symposium], 4th, Los Banos, Philippines, Oct. 22-27, 2000 (2001), 423-438. Editor(s): Khush, G. S.; Brar, D. S.; Hardy, B. Publisher: Science Publishers, Inc., Enfield, N. H.
CODEN: 69CFM6; ISBN: 1-57808-167-X

=> d 24 ab

L2 ANSWER 24 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 9
AB The fluctuation of proline content, and protein and mRNA levels of delta(1)-pyrroline-5-carboxylate synthetase (**P5CS**) and proline dehydrogenase (ProDH), both of which are involved in proline biosynthesis and degradation, in the shoots of **Arabidopsis** grown in light/dark cycles were demonstrated under salt-stressed and unstressed conditions. Proline content, as well as proteins and mRNAs of these enzymes, clearly oscillated in the light/dark cycles under the stressed and unstressed conditions. A reciprocal relationship between **P5CS** and ProDH was observed. Protein levels of **P5CS** and ProDH were well synchronized with their mRNA levels, although the fluctuation of protein levels was not as significant as that of their mRNA levels. Both mRNA and protein levels of the two enzymes as well as the proline content did not oscillate under the continuous light or the dark conditions. Thus, **P5CS** and ProDH gene expressions seemed to be involved in light irradiation. Moreover, relative water content (RWC) in the plants oscillated in the light/dark cycles. The fluctuations of proline content in shoot reversely responded to that of RWC. It is suggested that the expression of two genes responds sensitively to a subtle change of cellular water status, and accumulated proline keeps the osmotic balance between cells and the outer environment.

=> d 24 so

L2 ANSWER 24 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 9
SO Plant and cell physiology, Oct 2000. Vol. 41, No. 10. p. 1096-1101 Publisher: Kyoto, Japan : Japanese Society of Plant Physiologists.
CODEN: PCPHA5; ISSN: 0032-0781

=> d 31-40 ti

L2 ANSWER 31 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Stress-regulated expression constructs for improvement of plant tolerance of environmental stresses

L2 ANSWER 32 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 12
TI Biological functions of proline in morphogenesis and osmotolerance revealed in antisense trangenic **Arabidopsis** thaliana.

L2 ANSWER 33 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN

TI Increase of proline content in transgenic **rice** plants with a proline dehydrogenase antisense cDNA

L2 ANSWER 34 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 13
TI Isolation and characterization of two different cDNAs of delta 1-pyrroline-5-carboxylate synthase in alfalfa, transcriptionally induced upon salt stress.

L2 ANSWER 35 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 14
TI The presence of **p5cs** gene in **rice** and its function in proline-overproducing **rice** plant lines

L2 ANSWER 36 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 15
TI Overexpression of a Δ1-pyrroline-5-carboxylate synthetase gene and analysis of tolerance to water- and salt-stress in transgenic **rice**

L2 ANSWER 37 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Structure, function and regulation of AtP5CS genes in **Arabidopsis**

L2 ANSWER 38 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Regulation of proline biosynthesis in plants subjected to osmotic stress

L2 ANSWER 39 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 16
TI Calcium signalling in **Arabidopsis** thaliana responding to drought and salinity.

L2 ANSWER 40 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 17
TI Characterization of the gene for delta 1-pyrroline-5-carboxylate synthetase and correlation between the expression of the gene and salt tolerance in Oryza sativa L.

=> d 35 ab

L2 ANSWER 35 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 14
AB Hybridization anal. was conducted using proline synthase Δ'-pyrroline-5-carboxylate synthetase (**P5CS**) cDNA from root nodule of cowpea as probe. The results indicated the presence of the homolog sequence of **p5cs** gene of cowpea nodule in **rice** plant. Its transcription level increased under salt stress. The proline content and salt tolerance of the filial generation (F9) of proline-overproducing **rice** plant lines were markedly higher than those of the original type. Using these proline-overproducing **rice** plant lines as exptl. materials to conduct hybridization anal., it has been shown that the high proline content characteristics and increased salt tolerance are correlated to the presence of this gene and its increased transcription level.

=> d 41-47 ti

L2 ANSWER 41 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 18

TI Proline accumulation and salt-stress-induced gene expression in a salt-hypersensitive mutant of **Arabidopsis**.

L2 ANSWER 42 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 19
TI Differential expression of two **P5CS** genes controlling proline accumulation during salt-stress requires ABA and is regulated by ABA1, ABI1, and AXR2 in **Arabidopsis**.

L2 ANSWER 43 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 20
TI Characterization of Δ1-pyrroline-5-carboxylate synthetase gene promoter in transgenic **Arabidopsis** thaliana subjected to water stress

L2 ANSWER 44 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 21
TI Reciprocal regulation of delta 1-pyrroline-5-carboxylate synthetase and proline dehydrogenase genes control proline levels during and after osmotic stress in plants.

L2 ANSWER 45 OF 47 BIOSIS COPYRIGHT (c) 2004 The Thomson Corporation. on STN
TI Regulation of proline accumulation and **P5CS** gene expression in a salt-hypersensitive **Arabidopsis** mutant.

L2 ANSWER 46 OF 47 CAPLUS COPYRIGHT 2004 ACS on STN
TI Water stress-induced genes in **Arabidopsis** thaliana

L2 ANSWER 47 OF 47 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 22
TI Correlation between the induction of a gene for delta 1-pyrroline-5-carboxylate synthetase and the accumulation of proline in **Arabidopsis** thaliana under osmotic stress.

=> s p5cs and (prodh or proline dehydrogenase)
L3 27 P5CS AND (PRODH OR PROLINE DEHYDROGENASE)

=> dup rem l3
PROCESSING COMPLETED FOR L3
L4 16 DUP REM L3 (11 DUPLICATES REMOVED)

=> d 1-10 ti

L4 ANSWER 1 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
TI Phospholipase D Is a Negative Regulator of Proline Biosynthesis in Arabidopsis thaliana

L4 ANSWER 2 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
TI Monitoring expression profiles of Arabidopsis gene expression during rehydration process after dehydration using ca. 7000 full-length cDNA microarray

L4 ANSWER 3 OF 16 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 1
TI Light-dependent induction of proline biosynthesis by abscisic acid and

salt stress is inhibited by brassinosteroid in Arabidopsis.

L4 ANSWER 4 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2
TI The control of proline consumption by abscisic acid during osmotic stress recovery of canola leaf discs

L4 ANSWER 5 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
TI Drought-regulated expression of prolyl-tRNA synthetase genes in radish (Raphanus sativus) seedlings

L4 ANSWER 6 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
TI Plant molecular mechanism of proline accumulation under water stress

L4 ANSWER 7 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
TI Construction of stress tolerant transgenic grass plants with altered proline biosynthesis expressing a Δ1-pyrroline-5-carboxylate synthetase gene or an antisense **proline dehydrogenase** gene

L4 ANSWER 8 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effects of ABA and NaCl on metabolism of polyamines and proline in Suaeda glauca Bunge

L4 ANSWER 9 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
TI Proline metabolism in response to highest nitrogen dosages in green bean plants (Phaseolus vulgaris L. cv. Strike)

L4 ANSWER 10 OF 16 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 3
TI Oscillation and regulation of proline content by **P5CS** and **ProDH** gene expressions in the light/dark cycles in Arabidopsis thaliana L.

=> d so

L4 ANSWER 1 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
SO Journal of Biological Chemistry (2004), 279(15), 14812-14818
CODEN: JBCHA3; ISSN: 0021-9258

=> d ab

L4 ANSWER 1 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
AB Accumulation of proline has been observed in a large number of plant species in response to drought and salt stresses, suggesting a key role of this amino acid in plant stress adaptation. Upstream components of the proline biosynthesis signal transduction pathways are still poorly defined. We provide exptl. evidence that phospholipase D (PLD) is involved in the regulation of proline metabolism in Arabidopsis thaliana. The application of primary Bu alcs., which divert part of PLD-derived phosphatidic acid by transphosphatidylation, stimulated proline biosynthesis even without hyperosmotic constraints. Moreover, application of primary Bu alcs. enhanced the proline responsiveness of seedlings to mild hyperosmotic stress. These data indicate that some PLDs are neg. regulators of proline biosynthesis and that plants present a higher proline responsiveness to hyperosmotic stress when this regulator is abolished. We clearly demonstrate that PLD signaling for proline biosynthesis is similar to RD29A gene expression and different from the abscisic acid-dependent RAB18 gene expression. Our data reveal that PLDs play pos. and neg. roles in hyperosmotic stress signal transduction in plants, contributing to a precise regulation of ion homeostasis and plant salt tolerance.

=> d 6 ab

L4 ANSWER 6 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
AB A review. Proline, as an important compatible osmolyte, as well as other functions, plays an important role under adverse conditions. Principally, accumulation of proline can be achieved in three different ways : de novo synthesis in the affected cells; decreased degradation; proline transportation system is also involved. Δ1-Pyrroline-5-carboxylate synthetase (**P5CS**) and **proline dehydrogenase**(**ProDH**), play an crucial function in the synthesis and degradation of proline resp. In all, De novo synthesis, catabolism and transport of proline are highly regulated by both abiotic stress and cellular proline concentration ABA probably regulates the expression of **P5CS** gene due to the structure of the promoter of **P5CS**.

=> d 11-16 ti

L4 ANSWER 11 OF 16 BIOSIS COPYRIGHT (c) 2004 The Thomson Corporation. on STN
TI Hypersensitivity of an Arabidopsis sugar signaling mutant toward exogenous proline application.

L4 ANSWER 12 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
TI Hypersensitivity of an Arabidopsis sugar signaling mutant toward exogenous proline application. [Erratum to document cited in CA133:147618]

L4 ANSWER 13 OF 16 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 4
TI Hypersensitivity of an Arabidopsis sugar signaling mutant toward exogenous proline application. [Erratum: June 2000, v. 123 (2), p. 777-790.]

L4 ANSWER 14 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
TI Increase of proline content in transgenic rice plants with a **proline dehydrogenase** antisense cDNA

L4 ANSWER 15 OF 16 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 5
TI Regulation of levels of proline as an osmolyte in plants under water stress.

L4 ANSWER 16 OF 16 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 6
TI Reciprocal regulation of delta 1-pyrroline-5-carboxylate synthetase and **proline dehydrogenase** genes control proline levels during and after osmotic stress in plants.

=> d 14 ab

L4 ANSWER 14 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
AB Many plants accumulate compatible osmolytes, such as proline(Pro), or betaine, and sugar when they are subjected to salinity or drought stress. These compatible osmolytes appear to protect the plants from such stresses, which are the major factors that between the accumulation of

compatible osmolytes and the adaptation to osmotic stress in plants. We are investigating plant responses to water stress, such as salinity or drought, to elucidate the elucidate the mechanism of salinity tolerance in plants and to produce a salinity-tolerant plant. Among known compatible solutes, Pro is probably the most widely distributed osmolyte. The accumulation of Pro has been observed not only plants but also in eubacteria, marine invertebrates, protozoa, and algae. In plants, Pro is synthesized from L-glutamic acid (L-Glu) by two enzymes, Δ1-pyrroline-5-carboxylate (P5C) synthetase (**P5CS**) and P5C reductase (P5CR). L-pro is metabolized to L-Glu by two enzymes, **proline dehydrogenase** (**ProDH**) and P5C dehydrogenase (P5CDH). It has been reported that **P5CS** and **ProDH** are tate-limiting enzymes in Pro synthesis and metabolism of plants under water stress, resp. Therefore, it is expected that genetically engineered plants by overexpression of **P5CS** gene or suppression of **ProDH** gene overproduce Pro, and acquire osmotolerance, namely, the ability to tolerate environmental stresses such as high salinity and drought. Thus, we investigated whether or not transgenic plants with a **ProDH** antisense cDNA accumulate Pro of high level. In the present study, we generated transgenic rice plants with a **ProDH** antisense cDNA from Arabidopsis thaliana by Agrobacterium method. Several transgenics accumulated Pro at a significantly higher level than wild type plants under normal growth condition.

=> d 14 so

L4 ANSWER 14 OF 16 CAPLUS COPYRIGHT 2004 ACS on STN
SO Nippon Joshi Daigaku Kiyo, Rigakubu (1999), 7, 45-53
CODEN: NJDRF7; ISSN: 0919-1593

=> d 16 ab

L4 ANSWER 16 OF 16 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 6
AB Plants generally accumulate free proline under osmotic stress conditions. Upon removal of the osmotic stress, the proline levels return to normal. In order to understand the mechanisms involved in regulating the levels of proline, we cloned and characterized a **proline dehydrogenase** (PDH) cDNA from Arabidopsis thaliana (AtPDH). The 1745 bp cDNA contains a major open reading frame encoding a peptide of 499 amino acids. The deduced amino acid sequence has high homology with both Saccharomyces cerevisiae and Drosophila melanogaster proline oxidases and contains a putative mitochondrial targeting sequence. When expressed in yeast, the AtPDH cDNA complemented a yeast put1 mutation and exhibited proline oxidase activity. We also determined the free proline contents and the delta 1-pyrroline-5-carboxylate synthetase (**P5CS**) and PDH mRNA levels under different osmotic stress and recovery conditions. The results demonstrated that the removal of free proline during the recovery from salinity or dehydration stress involves an induction of the PDH gene while the activity of **P5CS** declines. The reciprocal regulation, of **P5CS** and PDH genes appears to be a key mechanism in the control of the levels of proline during and after osmotic stress. The PDH gene was also significantly induced by exogenously applied proline. The induction of PDH by proline, however, was inhibited by salt stress.

=> d 16 so

L4 ANSWER 16 OF 16 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States

of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 6
SO Molecular & general genetics : MGG, Dec 13, 1996. Vol. 253, No. 3. p. 334-341
Publisher: Berlin, Germany : Springer Produktions-Gesellschaft.
CODEN: MGGEAE; ISSN: 0026-8925

=> s ((yoshiba, y?) or (yoshiba y))/ayu
'AYU' IS NOT A VALID FIELD CODE
'AYU' IS NOT A VALID FIELD CODE
'AYU' IS NOT A VALID FIELD CODE
L5 0 ((YOSHIBA, Y?) OR (YOSHIBA Y))/AYU

=> s ((yoshiba, y?) or (yoshiba y))/au
L6 54 ((YOSHIBA, Y?) OR (YOSHIBA Y))/AU

=> s l6 and (p5cs or prodh or proline dehydrogenase)
L7 21 L6 AND (P5CS OR PRODH OR PROLINE DEHYDROGENASE)

=> dup rem l7
PROCESSING COMPLETED FOR L7
L8 10 DUP REM L7 (11 DUPLICATES REMOVED)

=> d 1-10 ti

L8 ANSWER 1 OF 10 CAPLUS COPYRIGHT 2004 ACS on STN
TI Construction of stress tolerant transgenic grass plants with altered proline biosynthesis expressing a Δ1-pyrroline-5-carboxylate synthetase gene or an antisense **proline dehydrogenase** gene

L8 ANSWER 2 OF 10 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
TI Molecular cloning and characterization of a cDNA encoding proline transporter in rice

L8 ANSWER 3 OF 10 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2
TI Antisense suppression of proline degradation improves tolerance to freezing and salinity in Arabidopsis thaliana

L8 ANSWER 4 OF 10 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 3
TI Biological functions of proline in morphogenesis and osmotolerance revealed in antisense trangenic Arabidopsis thaliana.

L8 ANSWER 5 OF 10 CAPLUS COPYRIGHT 2004 ACS on STN
TI Increase of proline content in transgenic rice plants with a **proline dehydrogenase** antisense cDNA

L8 ANSWER 6 OF 10 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 4
TI Regulation of levels of proline as an osmolyte in plants under water stress.

L8 ANSWER 7 OF 10 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved.
(2004) on STN DUPLICATE 5
TI Characterization of the gene for delta 1-pyrroline-5-carboxylate synthetase and correlation between the expression of the gene and salt

tolerance in Oryza sativa L.

L8 ANSWER 8 OF 10 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 6
TI A nuclear gene encoding mitochondrial **proline dehydrogenase**, an enzyme involved in proline metabolism, is upregulated by proline but downregulated by dehydration in Arabidopsis.

L8 ANSWER 9 OF 10 CAPLUS COPYRIGHT 2004 ACS on STN
TI Water stress-induced genes in Arabidopsis thaliana

L8 ANSWER 10 OF 10 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 7
TI Correlation between the induction of a gene for Δ1-pyrroline-5-carboxylate synthetase and the accumulation of proline in Arabidopsis thaliana under osmotic stress

=> d 2 so

L8 ANSWER 2 OF 10 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
SO Plant and Cell Physiology (2000), 41(6), 750-756
CODEN: PCPHA5; ISSN: 0032-0781

=> d 2 agb
'AGB' IS NOT A VALID FORMAT
In a multifile environment, a format can only be used if it is valid in at least one of the files. Refer to file specific help messages or the STNGUIDE file for information on formats available in individual files.
REENTER DISPLAY FORMAT FOR ALL FILES (FILEDEFAULT):ab

L8 ANSWER 2 OF 10 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
AB A cDNA encoding a proline (Pro) transporter (ProT) was isolated and characterized from a cDNA library prepared from 14-d-old seedlings of Oryza sativa cv. Akibare. The deduced amino acid sequence of the rice Pro T protein (OsProT) had 68.8% homol. to the ProT protein 1 from Arabidopsis thaliana and 59.6% homol. to that from Lycopersicon esculentum. Northern blot anal. revealed that the gene for OsProT (OsProT) was expressed in all organs examined, comparatively strongly in leaf sheath and stem. Salt treatment did not induce expression of OsProT but strongly induced expression of the gene for Δ1-pyrroline-5-carboxylate synthetase (**P5CS**), a key enzyme in Pro biosynthesis. Southern blot anal. revealed that OsProT has a gene family. OsProT specifically transported L-Pro in a transport assay using Xenopus laevis oocytes.

=> d 3 ab

L8 ANSWER 3 OF 10 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2
AB Synthesis, degradation, and transport of proline (Pro) are thought to cooperatively control its endogenous levels in higher plants in response to environmental conditions. To evaluate the function of Pro degradation in the regulation of the levels of Pro and to elucidate roles of Pro in stress tolerance, antisense transgenic Arabidopsis plants were generated with an AtProDH cDNA encoding **proline dehydrogenase** (**ProDH**), which catalyzes Pro degradation Several transgenic lines accumulated Pro at higher levels than wild-type plants, providing evidence for a key role of **ProDH** in Pro degradation in Arabidopsis. These antisense transgenics were more tolerant to freezing and high salinity than wild-type plants, showing a pos. correlation between Pro accumulation and stress tolerance in plants.

=> d 3 so

L8 ANSWER 3 OF 10 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2
SO FEBS Letters (1999), 461(3), 205-210
CODEN: FEBLAL; ISSN: 0014-5793

=> d 4 ab

L8 ANSWER 4 OF 10 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 3
AB Many organisms, including higher plants, accumulate free proline (Pro) in response to osmotic stress. Although various studies have focused on the ability of Pro as a compatible osmolyte involved in osmotolerance, its specific role throughout plant growth is still unclear. It has been reported that Pro is synthesized from Glu catalyzed by a key enzyme, delta(1)-pyrroline-5-carboxylate synthetase (**P5CS**), in plants. To elucidate essential roles of Pro, we generated antisense transgenic Arabidopsis plants with a **P5CS** cDNA. Several transgenics accumulated Pro at a significantly lower level than wild-type plants, providing direct evidence for a key role of **P5CS** in Pro production in Arabidopsis. These antisense transgenics showed morphological alterations in leaves and a defect in elongation of inflorescences. Furthermore, transgenic leaves were hypersensitive to osmotic stress. Microscopic analysis of transgenic leaves, in which the mutated phenotype clearly occurred, showed morphological abnormalities of epidermal and parenchymatous cells and retardation of differentiation of vascular systems. These phenotypes were suppressed by exogenous L-Pro but not by D-Pro or other Pro analogues. In addition, Pro deficiency did not broadly affect all proteins but specifically affected structural proteins of cell walls in the antisense transgenic plants. These results indicate that Pro is not just an osmoregulator in stressed plants but has a unique function involved in osmotolerance as well as in morphogenesis as a major constituent of cell wall structural proteins in plants.

=> d 5 ab

L8 ANSWER 5 OF 10 CAPLUS COPYRIGHT 2004 ACS on STN
AB Many plants accumulate compatible osmolytes, such as proline(Pro), or betaine, and sugar when they are subjected to salinity or drought stress. These compatible osmolytes appear to protect the plants from such stresses, which are the major factors that between the accumulation of compatible osmolytes and the adaptation to osmotic stress in plants. We are investigating plant responses to water stress, such as salinity or drought, to elucidate the elucidate the mechanism of salinity tolerance in plants and to produce a salinity-tolerant plant. Among known compatible solutes, Pro is probably the most widely distributed osmolyte. The accumulation of Pro has been observed not only plants but also in eubacteria, marine invertebrates, protozoa, and algae. In plants, Pro is synthesized from L-glutamic acid (L-Glu) by two enzymes, Δ1-pyrroline-5-carboxylate (P5C) synthetase (**P5CS**) and P5C reductase (P5CR). L-pro is metabolized to L-Glu by two enzymes, **proline dehydrogenase** (**ProDH**) and P5C dehydrogenase (P5CDH). It has been reported that **P5CS** and **ProDH** are tate-limiting enzymes in Pro synthesis and metabolism of plants under water stress, resp. Therefore, it is expected that genetically engineered plants by overexpression of **P5CS** gene or suppression of **ProDH** gene overproduce Pro, and acquire osmotolerance, namely, the ability to tolerate environmental stresses such as high salinity and

drought. Thus, we investigated whether or not transgenic plants with a **ProDH** antisense cDNA accumulate Pro of high level. In the present study, we generated transgenic rice plants with a **ProDH** antisense cDNA from Arabidopsis thaliana by Agrobacterium method. Several transgenics accumulated Pro at a significantly higher level than wild type plants under normal growth condition.

=> d 5 so

L8 ANSWER 5 OF 10 CAPLUS COPYRIGHT 2004 ACS on STN
SO Nippon Joshi Daigaku Kiyo, Rigakubu (1999), 7, 45-53
CODEN: NJDRF7; ISSN: 0919-1593

=> d 6 ab

L8 ANSWER 6 OF 10 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 4
AB Compatible osmolytes are potent osmoprotectants that play a role in counteracting the effects of osmotic stress. Proline (Pro) is one of the most common compatible osmolytes in water-stressed plants. The accumulation of Pro in dehydrated plants is caused both by activation of the biosynthesis of Pro and by inactivation of the degradation of Pro. In plants, L-Pro is synthesized from L-glutamic acid (L-glu) via delta 1-pyrroline-5-carboxylate (P5C) by two enzymes, P5C synthetase (**P5CS**) and P5C reductase (P5CR). L-Pro is metabolized to L-Glu via P5C by two enzymes, **proline dehydrogenase** (oxidase) (**ProDH**; EC 1.5.99.8) and P5C dehydrogenase (P5CDH; EC 1.5.1.12). Such metabolism of Pro is inhibited when Pro accumulates during dehydration and it is activated when rehydration occurs. Under dehydration conditions, when expression of the gene for **P5CS** is strongly induced, expression of the gene for **ProDH** is inhibited. By contrast, under rehydration conditions, when the expression of the gene for **ProDH** is strongly induced, the expression of the gene for **P5CS** is inhibited. Thus, **P5CS**, which acts during the biosynthesis of Pro, and **ProDH**, which acts during the metabolism of Pro, appear to be the rate-limiting factors under water stress. Therefore, it is suggested that levels of Pro are regulated at the level of transcriptional the genes of these two enzymes during dehydration and rehydration. Moreover, it has been demonstrated that Pro acts as an osmoprotectant and that overproduction of Pro results in increased tolerance to osmotic stress of transgenic tobacco plants. Genetically engineered crop plants that overproduce Pro might, thus, acquire osmotolerance, namely, the ability to tolerate environmental stresses such as drought and high salinity.

=> d 6 so

L8 ANSWER 6 OF 10 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 4
SO Plant and cell physiology, Oct 1997. Vol. 38, No. 10. p. 1095-1102
Publisher: Kyoto, Japan : Japanese Society of Plant Physiologists.
CODEN: PCPHA5; ISSN: 0032-0781

=> s ((shinozaki k?) or (shinozaki, k?))/au
L9 2138 ((SHINOZAKI K?) OR (SHINOZAKI, K?))/AU

=> s l9 and (p5cs or prodh or proline dehydrogenase)
L10 37 L9 AND (P5CS OR PRODH OR PROLINE DEHYDROGENASE)

=> dup rem l10
PROCESSING COMPLETED FOR L10
L11 20 DUP REM L10 (17 DUPLICATES REMOVED)

=> d 1-10 ti

L11 ANSWER 1 OF 20 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
TI Comparative genomics in salt tolerance between Arabidopsis and Arabidopsis-related halophyte salt cress using Arabidopsis microarray

L11 ANSWER 2 OF 20 CAPLUS COPYRIGHT 2004 ACS on STN
TI A novel subgroup of bZIP proteins functions as transcriptional activators in hypoosmolarity-responsive expression of the **ProDH** gene in Arabidopsis

L11 ANSWER 3 OF 20 CAPLUS COPYRIGHT 2004 ACS on STN
TI Monitoring expression profiles of Arabidopsis gene expression during rehydration process after dehydration using ca. 7000 full-length cDNA microarray

L11 ANSWER 4 OF 20 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2
TI Toxicity of free proline revealed in an Arabidopsis T-DNA-tagged mutant deficient in **proline dehydrogenase**

L11 ANSWER 5 OF 20 CAPLUS COPYRIGHT 2004 ACS on STN
TI Construction of stress tolerant transgenic grass plants with altered proline biosynthesis expressing a Δ1-pyrroline-5-carboxylate synthetase gene or an antisense **proline dehydrogenase** gene

L11 ANSWER 6 OF 20 AGRICOLA Compiled and distributed by the National Agricultural Library of the Department of Agriculture of the United States of America. It contains copyrighted materials. All rights reserved. (2004) on STN DUPLICATE 3
TI ACTCAT, a novel cis-acting element for proline- and hypoosmolarity-responsive expression of the **ProDH** gene encoding **proline dehydrogenase** in Arabidopsis.

L11 ANSWER 7 OF 20 CAPLUS COPYRIGHT 2004 ACS on STN
TI Proline degradation enzyme antisense suppression for plant stress tolerance improvement

L11 ANSWER 8 OF 20 BIOSIS COPYRIGHT (c) 2004 The Thomson Corporation. on STN
TI Promoter analysis of **ProDH** gene induced by hypoosmolarity and L-Pro in Arabidopsis thaliana.

L11 ANSWER 9 OF 20 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 4
TI Molecular cloning and characterization of a cDNA encoding proline transporter in rice

L11 ANSWER 10 OF 20 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 5
TI Antisense suppression of proline degradation improves tolerance to freezing and salinity in Arabidopsis thaliana

=> d 7 ab

L11 ANSWER 7 OF 20 CAPLUS COPYRIGHT 2004 ACS on STN
AB Plant stress tolerance improvement by suppression of proline degradation pathway enzyme genes is disclosed. Synthesis, degradation, and transport of

proline (Pro) are thought to cooperatively control its endogenous levels in higher plants in response to environmental conditions. To evaluate the function of Pro degradation in the regulation of the levels of Pro and to elucidate roles of Pro in stress tolerance, antisense transgenic Arabidopsis plants were generated with an AtProDH cDNA encoding **proline dehydrogenase** (**ProDH**), which catalyzes Pro degradation Several transgenic lines accumulated Pro at higher levels than wild-type plants, providing evidence for a key role of **ProDH** in Pro degradation in Arabidopsis. These antisense transgenics were more tolerant to freezing and high salinity than wild-type plants, showing a pos. correlation between Pro accumulation and stress tolerance in plants.

=> d 7 so

L11 ANSWER 7 OF 20 CAPLUS COPYRIGHT 2004 ACS on STN
SO Jpn. Kokai Tokkyo Koho, 8 pp.
CODEN: JKXXAF

=> d 7 pi

L11 ANSWER 7 OF 20 CAPLUS COPYRIGHT 2004 ACS on STN

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001186879	A2	20010710	JP 2000-5221	20000105